CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

S-E-C-R-E-T

25X1

COUNTRY	USSR	REPORT	
SUBJECT	Aircraft Engine Development at Kuybyshev and Kimry-Savelovo	DATE DISTR.	18 March 1955
		NO. OF PAGES	9
DATE OF INFO.		REQUIREMENT NO.	RD
PLACE ACQUIRED		REFERENCES	

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Activities at ZAVOD II - KUYBYSHEV

The 003C Engine

1. On arriving in KUYBYSHEV in November, 1946 the first task of the BMW Group was to install the machines brought from STASSFURT. Initially, considerable difficulty was experienced since some of the machines had been carelessly packed and vital parts were missing, but by January 1947 a certain amount of order had appeared from the chaos, so that by the end of the following month the BMW Group was in a position to begin development work on the 003C engine. Apparently, the Russians had commandeered the entire stock of compressor and turbine blades from STASSFURT and six or seven rotor assemblies were built up from stock. Work on the 003C continued until the end of 1947. Informant did not know how many rotor assemblies were completed during the year but he believed that only sufficient were constructed to enable works tests and final acceptance tests to be made so that the engine could go into production elsewhere.

The 012 Engine

2. [redacted] 25X1
work was begun in the machine shop early in 1947 on the assembly of the first rotor discs. [redacted] the first drop-forged components came from [redacted] 25X1
BESSEMYANKA ready for assembly. Later in 1948, [redacted] most of the rotor [redacted] 25X1
discs and turbine and compressor blades were being machined at KUYBYSHEV. [redacted] 25X1
[redacted] the first turbine [redacted] 25X1
blades machined at KUYBYSHEV were of high-grade nickel steel. [redacted] 25X1
[redacted] 25X1
[redacted] one complete rotor assembly was produced per month. At this time, the [redacted] 25X1
German machinists were doing the bulk of the work, though a fair number of [redacted] 25X1
Russians had been introduced. [redacted] 25X1
[redacted] some turbine and compressor blades [redacted] 25X1
for the 012 had been brought from GERMANY, but [redacted] these [redacted] 25X1
were only used for first three or four rotor assemblies. [redacted] 25X1
[redacted] slight variations were necessary in the machining of the later blades for [redacted] 25X1
the 012 which, [redacted] were produced in the USSR. [redacted] 25X1
[redacted] 25X1

The Rolls Royce Nene Engine

3. In September 1949 work was suddenly suspended on the 012 Engine and the machine shop was told to stand by and await working drawings for the Rolls Royce NENE Engine. [redacted] 25X1
[redacted] 25X1
[redacted] the Nene was to go into production in BESSEMYANKA somewhere about June 1950. [redacted] 25X1
[redacted] single-engined aircraft being [redacted] 25X1
flight tested during 1950/51 from a nearby aerodrome which were generally supposed to be powered by the Nene.

The 022A Engine

4. In February 1950, the first working drawings for the 022A Engine appeared in the machine shop, though work still continued on compressor and turbine blades for the 012. [redacted] 25X1
[redacted] 25X1
[redacted] its development 25X1
overlapped the later stages of the work on the 012. The early working

SECRET [redacted] /drawings..... 25X1

drawings for the 022 called for light-alloy blades for the initial compressor stages (details unknown), but he knew that parallel development was also being carried out on compressors using steel blades for all stages. As in the case of the 012, the rate of production was normally one complete rotor assembly per month. The machining of turbine blades at Experimental Works No. 2 was always regarded by the Russians as a "bottle-neck" and extra shifts had frequently to be worked. Nevertheless, Informant is sure that even with two shifts the average rate of production never exceeded three complete rotor assemblies in two working months.

5. 25X1 25X1 no more than 50 complete rotor assemblies were ever turned out. 25X1 Working drawings of the first assembly called for only two turbine stages but later assemblies had an additional stage. 25X1 the first turbine stage had 67 blades, the second 63 blades, and the third 59 blades. At first, the blades were pegged into the discs and no additional securing devices were used, but later, towards the end of 1949, the fir-tree roots of the blades were machined so that they could be slotted into the discs and secured by locking rings. 25X1 the change was made to speed up the assembly and there was no question of the original turbine assembly having proved unsatisfactory.

6. At the beginning of 1951 shroud rings were fitted on the three turbine stages to reduce blade tip clearance. At first, graphite blocks were slotted into these shroud rings and 25X1 engines so fitted had run 25X1 successfully on the test bed during 1951. 25X1 an engine so modified had run for 50 hour 25X1 25X1 Similar blocks had been 25X1 used to reduce blade tip clearance in GERMANY and 25X1 the first blocks used at KUIBYSHEV had been brought from DESSAU or STASSFURT since they had German markings. Subsequently, test runs were made with aluminium blocks but these proved unsatisfactory, as did blocks of a dark-brown ceramic material which were tried at the end of 1951 or the beginning of 1952. 25X1 there was no difficulty in replacing the graphite blocks which were so arranged that defective units could be removed individually by loosening the locking ring and never more than 20 or 30 blocks had to be replaced at one time in Informants experience.

7. In February or March 1952 the machine shop began to cast and machine brass blocks to be used for the same purpose, and these were used from then onwards for the 022A and later for the 'K' engine. For ease of manufacture the blocks were cast in a mould 50 cm long, usually with a backing of tin. After being cut into lengthsof some 20 cm, they were milled on the outside edge to match the outer diameter of the appropriate turbine rotor. Assembly and replacement presented no problems since the blocks were dovetailed inside the shroud ring in the same way as the graphite blocks previously described.

The 'K' Engine

8. By the time the drawings for the 'K' engine appeared in the machine shop the German specialists and machinists had largely been replaced by Russians and Informant was acting more or less as an adviser to his Russian opposite number. 25X1 the 'K' had a fourteen-stage compressor with light alloy blades 25X1 on the initial stages. some compressors at least were assembled with light alloy blades on the first five or six stages. The first turbine rotor had 69 blades and these 25X1 were of Nimonic. the remaining turbine stages were all of high-grade nickel steel 25X1 The brass blocks inside the shroud ring to reduce blade tip clearance were used for all the 'K' engines seen by Informant.

9. In 1952 the machine shop received an order for blades to be used in a supersonic compressor and from Informant's recollections three sets of blades

25X1

were machined; the details of the type of root employed for the blades are given in the sketch attached at Appendix 'A' to this report. 25X1
this compressor had been tested but not in a gas turbine. 25X1
the three sets of blades had been assembled and run on the test bed for experimental purposes sometime in 1952 or early 1953 when they were driven by an 022A engine. 25X1

10. Experiments were made with the "lost wax" process in 1952 25X1
the 25X1
stators for the first turbine stage on the 'K' had been cast by this means.

KIMRY-SAVELOVO

11. seventy-three Germans from the Engine Development 25X1
Section at KUIBYSHEV were transferred at the end of November 1953 to KIMRY-SAVELOVO where they were joined by twenty-seven other engine specialists who had come to KIMRY via OSTASHKOV, having left KUIBYSHEV in June 1953. With a hundred airframe specialists from PODBEREZHYE they formed the development team for the EF 152 under BAADE.

12. Feeling ran high at KIMRY-SAVELOVO because most of the German specialists had expected to be repatriated within a month at the most of leaving KUIBYSHEV, and considerable resentment was shown when BAADE announced that he intended to work out a paper project for an Experimental Station to be set up in the DDR to work on airframes and engines for the EF 152, described in glowing terms as a "civil aircraft of advanced design for the use of the satellite countries". 25X1
the EF 152 was a high-winged aircraft with pronounced sweepback. 25X1
it was intended to carry thirty-six passengers on short flights or twenty-five passengers when used on long distance work. In January or February 1954 25X1
a wooden mock-up of the nose of the EF 152 which had been built 25X1
to assist the design team in locating the controls but no other evidence that the project had passed the drawing-board stage.

13. the design of the engine 25X1
was based on the 022A and that it was a pure jet with a twelve-stage 25X1
compressor and a three-stage turbine, designed to give a static thrust of 3,000 kg at sea level. Rough drawings which he saw from time to time showed that four such units mounted in two underslung 'pods' were to be used for the EF 152. this power unit, which was given 25X1
the Code Number 014, was a pure jet version of the 022A designed to use the same accessories and auxiliary equipment as the 022A.

14. 25X1
25X1
the following list represented 25X1
the minimum labour force required to produce the four 014 engines per month which BAADE called for in his original development programme. BAADE envisaged a labour force of 1,000 for the engine development station at PIRNA of which 140 men were allotted to the machine shop. 25X1

1 Shop Manager (probably Dr. BREDENDICK)

4 Machine Shop Foremen (lathe shop, milling shop, grinding shop and general machine shop)

30 Tool-room operators 25X1

12 Jig designers.

18 Milling machine operators

25X1

25X1

20 Turners

20 Grinders

4 Jig tool fitters

1 Thread grinding machine operator

15. [redacted] requirements for the machine shop at PIRNA [redacted] was approved:- 25X1 25X1

2 Jig Boring machines (to be ordered from GIP, Switzerland ~~from~~ from HILLE, DRESDEN)

1 Turret lathe

1 Thread grinding machine

1 Copying grinder

1 Copying milling machine

12 Selective head engine lathes with centres up to 300 mm

7 Lathes (to be ordered from KAERGER - K I and K II)

1 Lathe for relieving work

4 Surface grinding machines (for work 300 mm x 1,000 mm)

4 Surface grinding machines (for work 500 mm x 1,500 mm)

2 Grinding machines (for small jobs)

6 Tool grinders

2 Horizontal drilling machines

16. For the machining of turbine blades and for copying work generally the following machines were to be ordered:-

2 Lathes (with face plates for jobs up to 1,000 mm)

3 Engine lathes

1 Press (60 tons)

2 Automatic die sinking machines

6 Vertical milling machines

12 Horizontal milling machines (including 6 universal)

4 "DECKEL" automatic die sinking machines

2 Profile milling machines (Informant explained that these were specially designed machines which had been developed by the German aero-engine indus... for the milling of turbine blades).

2 Copying lathes ('Heyligenstedt") with electric control

1 Surface grinding machines (for jobs of 300 mm x 1,000 mm)

1 " " " (for jobs of 500 mm x 1,500 mm)

[redacted] 25X1

25X1

1 Drilling machine (Morse 2", 4 spindles)

1 Radial boring machine (Morse 4")

1 Grinding machine (for jobs up to 100 mm)

3 Horizontal milling machines

2 Milling machines for tool making

4 Universal horizontal milling machines

4 Planing machines.

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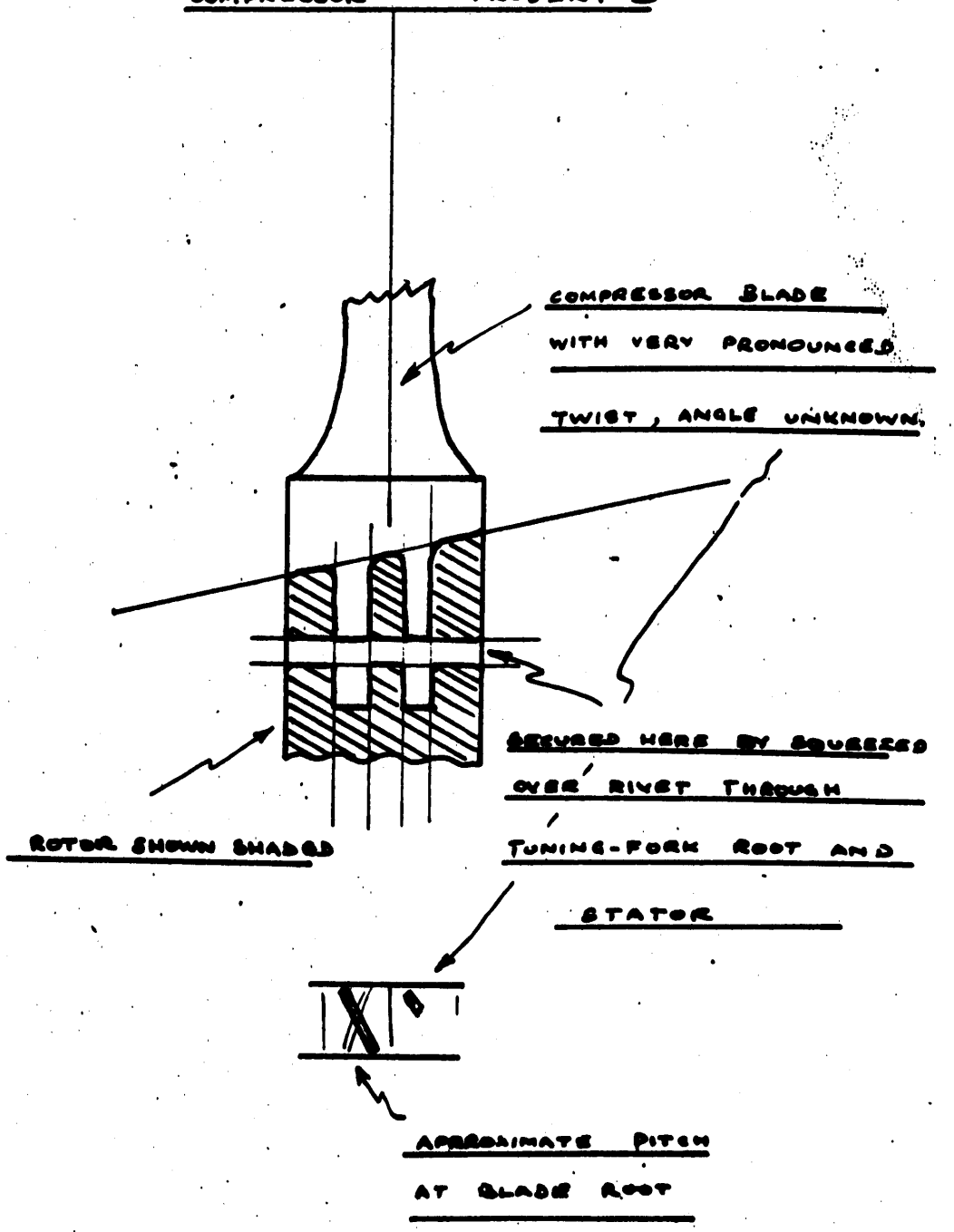
COMPRESSOR BLADE FOR SUPERSONIC COMPRESSOR ~ PROJEKT 'D'



APPENDIX 'A' TO STIB REPORT S1219/DR/2010.

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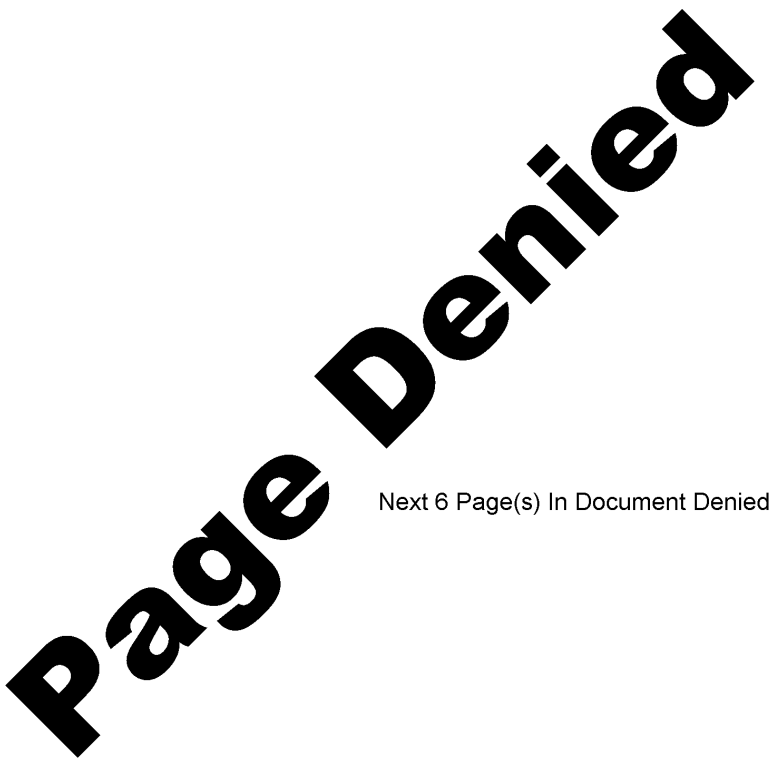

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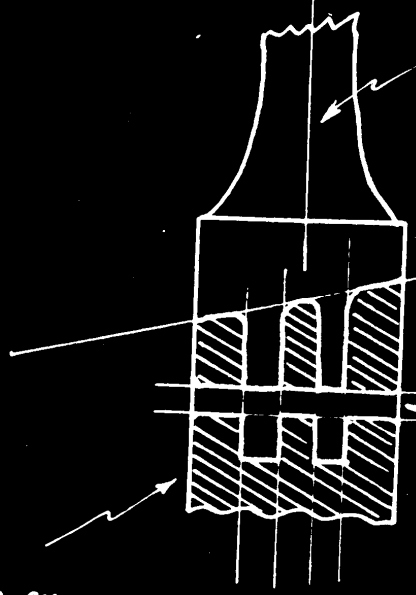
COMPRESSOR BLADE FOR SUPERSON[illegible]

COMPRESSOR ~ PROJEKT 'D'



APPENDIX 'A' TO STIB

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